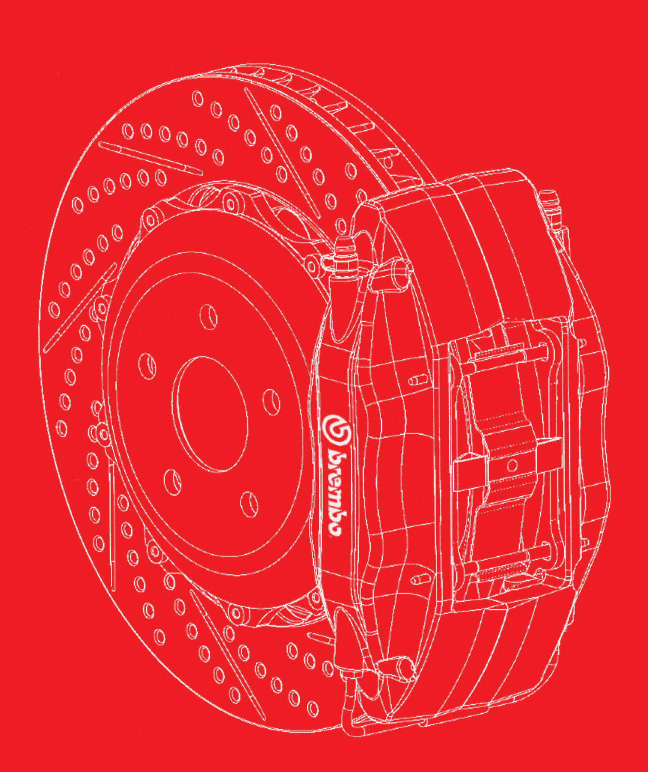


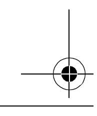
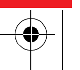
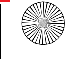
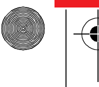
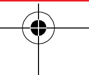


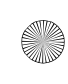



Gran Turismo Brake System

INSTRUCTIONS for REPLACING CALIPER and DISC

INSTRUCCIONES para la SUSTITUCIÓN de DISCOS y PINZAS



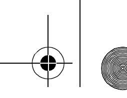
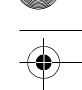
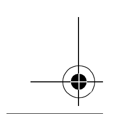
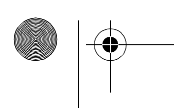
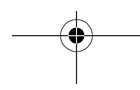
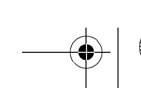
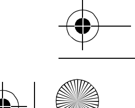
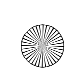
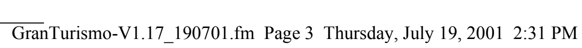
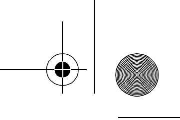




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INTRODUCTION

Congratulations on your purchase!

To speak of Brembo is to speak of the veritable history of the braking system. Since the 1960's, Brembo has been one of the premiere global suppliers of high performance braking system and components. Brembo has met the challenges and set the standards for the braking industry worldwide. Today, with the dawning of the new millennium, the Brembo group continues to grow, develop and move towards new objectives.

Looking toward the future, Brembo has integrated its production processes with a network of our own foundries, the latest in testing technology and modern robotic manufacturing units present in each facility. Hundreds of specialists in research and development contribute to the innovation and technology needed for advanced solutions to the braking system. This puts Brembo in a position to provide the highest quality standards and the very latest in technological know-how applied to its product.

Brembo pushes the technology envelope every weekend around the globe by providing the highest level of braking available in all forms of motor racing. From NASCAR, CART, Formula 1 or Grand Prix motorcycles, the fierce competition from our championships in motorsports has helped Brembo to develop and implement the latest in technology through the entire range of Brembo braking systems.

At Brembo, we believe the knowledge gained through producing Original Equipment for the leading automotive manufactures and worldwide racing competitions: together echoes the creation of our ***Gran Turismo* High Performance Brake Systems**.

INTRODUCCION

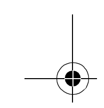
Enhorabuena por su compra!

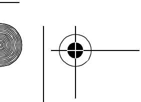
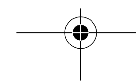
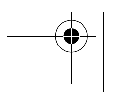
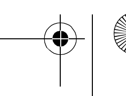
Hablar de Brembo significa referirnos a la auténtica historia de la instalación frenante. A partir de los años '60, Brembo ha empleado todos sus esfuerzos y su competencia para convertirse en uno de los principales abastecedores globales de instalaciones frenantes de elevada tecnología; Hoy, en los albores del tercer milenio, nuestro grupo está individualizando nuevos objetivos.

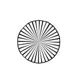
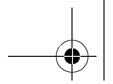
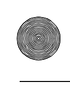
En los últimos años, la Sociedad ha integrado sus procesos de producción con la adquisición de talleres de fundición que han posibilitado la ampliación de los conocimientos técnicos y de diseño de importantes componentes de las instalaciones frenantes. Para estar siempre a la vanguardia en las soluciones técnicas, Brembo ha dado nuevos impulsos a la búsqueda avanzada de materiales y metodologías de fabricación. Más de cien especialistas trabajan en el sector de la investigación y desarrollo y, gracias a sus nuevos talleres de fundición y a los modernos centros de fabricación robotizados ya presentes en los establecimientos de producción, Brembo puede garantizar los mejores estándares cualitativos y las soluciones tecnológicas más avanzadas para sus productos.

En el mundo de los automóviles de carrera, Brembo es desde hace muchos años sinónimo de frenos excelentes. Cada fin de semana se pueden observar las victorias de Brembo en las carreras: NASCAR, CART, Fórmula 1 o Superbike.

En Brembo consideramos que la experiencia se alcanza produciendo componentes originales para los fabricantes líder en el campo automobilistico y en competiciones mundiales





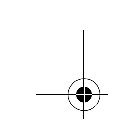
Developed to meet the demand of the weekend racer, the enthusiast, the family in the SUV and people like you who are passionate about the performance abilities of automobiles.

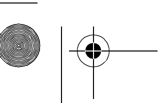
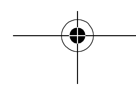
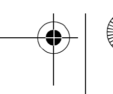
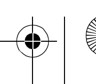
Drive Safely.

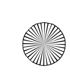
de carreras y a ello corresponde la realización de nuestro ***Gran Turismo* High Performance Brake Systems**.

Nuestras instalaciones frenantes de elevada prestación han sido pensadas para responder a las exigencias de los pilotos del week-end, aficionados, familias deportivas en SUV y personas como Uds., apasionados por los elevados estándares de prestación de los automóviles.

Conduzcan con prudencia.









SAFETY AND LIABILITY INFORMATION

WARNING

Installation of any component or system should only be performed by persons experienced in the installation and proper operation of disc brake systems. These are high performance components which will not function as intended if misused or if not installed properly to the correct specifications. It is the responsibility of the individual installing any brake component or system to determine the suitability of the component or system for that particular application.

DISCLAIMER OF WARRANTY

By purchasing this product and opening this box, purchasers expressly acknowledge, understand and agree that they take, select and purchase these brake systems, parts, and equipment from Brembo, its affiliates, distributors, and agents (collectively, "Brembo") "as is" and "with all faults." The entire risk as to the quality and performance of these brake systems, parts or equipment is with the purchasers. Should the goods prove defective following their purchase, the purchasers assume the entire cost for all necessary servicing or repair or any resulting liability.

Brembo makes no warranties whatsoever, expressed or implied, oral or written, to purchasers or any users of these products. Brembo expressly disclaims any implied warranty of merchantability or warranty of fitness for a particular purpose, including fitness of these systems, parts or equipment for racing

INFORMACIONES SOBRE LA SEGURIDAD

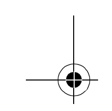
ATENCIÓN

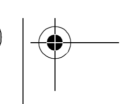
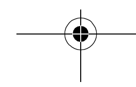
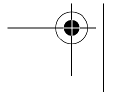
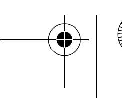
La instalación de cualquier componente o kit debe ser efectuada por personal que sea competente en el sector de las instalaciones frenantes de disco. Éstos son componentes de elevada prestación que no funcionan si son empleados en modo impropio o si no son instalados siguiendo correctamente las instrucciones. Es responsabilidad del personal que instala cualquier componente o kit de frenos, determinar la validez del componente o kit para esa particular aplicación.

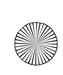
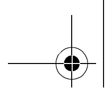
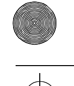
RENUNCIA A LA GARANTÍA

Adquiriendo este producto y abriendo la confección, los compradores reconocen, comprenden y concuerdan en elegir, comprar y recibir estos kit de frenos, componentes y herramientas de Brembo, de sus afiliados, concesionarios y agentes (conjuntamente "Brembo") "tal como son" y "con todas las imperfecciones". Todo riesgo relativo a la calidad y prestaciones de estos kit de frenos, componentes o herramientas queda a cargo de los compradores. Si los productos debieran resultar defectuosos después de su compra, los compradores se asumen todos los gastos por eventuales servicios y reparaciones, o cualquier otra responsabilidad derivante.

Brembo no ofrece a los compradores o usuarios de estos productos ninguna garantía, explícita o implícita, oral o escrita. Brembo rechaza expresamente cualquier garantía implícita para la comercialización o garantías para empleos particulares, incluyendo el



By purchasing this product and opening this box, purchasers expressly acknowledge that Brembo does not make or cause to make any representation or promise to purchasers which relate to the brake systems parts or equipment, that becomes part of the basis of the bargain between Brembo and purchasers. Purchasers expressly affirm that they are relying upon their own skill and judgment in selecting and purchasing these goods as suitable for purchasers intended use.

Purchasers understand and agree that officer/ director, salesman, distributor, or agent of Brembo has any authority to make any statment contrary to the terms of this disclaimer and agreement. On the contrary, Brembo disavows any statment contrary to what is written above.

WARNING

The brake system is a safety device; personnel performing any replacement or maintenance operations must be competent and certified.

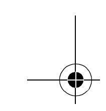
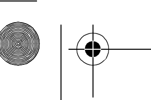
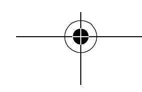
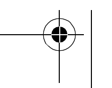
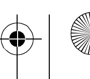
empleo de estos kit, componentes y herramientas en competiciones de carrera.

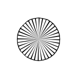
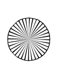
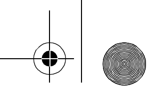
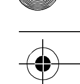
Al adquirir este producto y abrir la confección, los compradores reconocen expresamente que Brembo no expresa ni pretende expresar ninguna afirmación ni promesa que pudiera re-ferirse al kit de frenos, componentes y herramientas, y que ello constituye parte integrante del acuerdo entre Brembo y los compradores. Los compradores declaran expresamente que confían solamente en su capacidad de juicio en la elección y compra de estos productos en relación con el empleo que piensan dar a los mismos.

Los compradores entienden y acuerdan que los funcionarios/directores, vendedores, concesionarios o agentes de Brembo tienen la facultad de ejercitar cualquier acción en contraste con los términos de esta renuncia y contrato. Por su parte, Brembo no admite ninguna acción en contraste con lo expresado anteriormente.

PELIGRO

Puesto que el sistema frenante es un órgano de seguridad, el personal que realiza cualquier tipo de sustitución y manutención debe ser competente y cualificado.



GENERAL INFORMATION

WHEEL FITMENT

Brembo recommends:

- the tires' external diameter must equal that defined by the vehicle's manufacturer;
- if bigger tires are used, make sure that their rotation is not hampered under all conditions of use of the vehicle;
- install the Gran Turismo Brake System on both sides.

Lack of compliance with these preliminary recommendations can result in an incorrect reading of the vehicle's speed or, in the worst case, it can seriously damage the tire's structure and affect vehicle's safety.

Due the increased disc diameter and caliper width of the Brembo *Gran Turismo* Brake Systems, it may be necessary to use different wheels or wheel spacers.

Before starting the replacement procedure, make sure that the spare parts used for replacement are suitable to the make and model of the vehicle.

Detailed brake crossections are available by contacting Brembo or by visiting our website.

INFORMACIONES GENERALES

FIJADO RUEDA

Brembo recomienda:

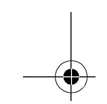
- El diámetro exterior de los neumáticos debe ser igual a lo previsto por el fabricante del vehículo;
- En caso de utilizar neumáticos más anchos, habrá que controlar que no hayan impedimentos para la libre rotación de los mismos en todas las condiciones de uso del vehículo;
- Sustituir el Gran Turismo Brake System de ambos lados.

Si no se observan estas recomendaciones preliminares se puede verificar una lectura equivocada de la velocidad del vehículo o, en la peor de las hipótesis, se pueden provocar graves daños a la estructura de los neumáticos y, por tanto, riesgos para la seguridad del vehículo.

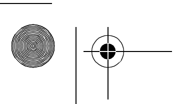
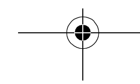
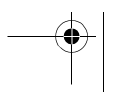
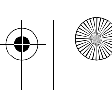
En el caso de un incremento del diámetro del disco y de la pinza del Brake System del *Gran Turismo* Brembo, es necesario utilizar ruedas diferentes o espaciadores para ruedas.

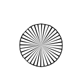
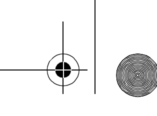
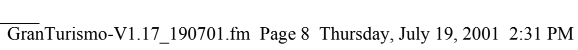
Antes de comenzar el procedimiento de sustitución, hay que asegurarse de que los recambios utilizados para la sustitución se adapten a la marca y al modelo del vehículo.

Los detalles relativos a la sección pueden conocerse contactando Brembo o visitando nuestro sito web.









DISC ROTATION DIRECTION

It is a popular misconception that the slots or drillings in a disc determine the direction of rotation. In truth, for an internally vented disc, the geometry of the vanes dictates the direction of rotation.
There are three vane types in use:

- Straight
- Pillar vane (comprised of many small posts)
- Curved vane

The first two vane types are non-directional, and can be used on either side of the vehicle. The curved vane disc, however, is directional. A curved vane disc must be installed with the vanes running back from the inside to outside diameters in the direction of rotation (see the figure).
Orienting the disc in the manner creates a centrifugal pump. The rotation of the disc causes air to be pumped from the center of the disc, through the vanes, and out through the outside diameter of the disc. This greatly enhances the disc's ability to dissipate heat.

ROTATION

Additionally, all of Brembo's slotted discs are directional as well, regardless of the vane geometry. The discs should be installed such that the end of the slot nearest the outer edge of the disc contacts the pad first.
(see the figure)

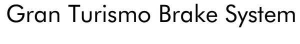
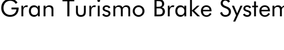
DIRECCION DE ROTACION DEL DISCO

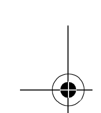
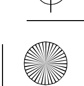
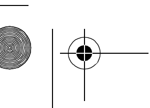
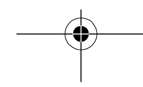
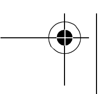
Es un error bastante difundido el pensar que la dirección de rotación del disco venga determinado por ranuras o incisiones. En realidad, para un disco con la zona interior vaciada, la geometría de las palas que allí se encuentran díctan la dirección de rotación.
Hay tres tipos de palas utilizadas:

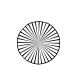
- Derechas.
- Columna de palas (comprende muchos postes pequeños).
- Palas curvadas.

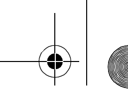
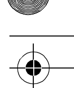
Las dos primeras tipologías de palas no son direccionales, y pueden ser utilizados en la otra parte del vehículo. La pala curvada , siempre es direccional. Un disco a pala curvada puede ser instalado con las palas de giro desde el interior hacia el exterior del diámetro en la dirección de rotación (ver figura).
La orientación del disco crea una bomba centrífuga. La rotación del disco crea una corriente de aire que viene bombeado desde el centro del disco , a través de las palas, y sale a través de la parte externa del diámetro del disco. Esta característica del disco permite la disipación del calor.

Además, todos los discos incididos Brembo son direccionales, sin tener en cuenta la forma geométrica de las palas. Los discos suelen estar instalados hacia el final de la ranura más cercana al borde esterno del disco que se encuentra en contacto con la pastilla.
(ver figura)



CALIPER ORIENTATION

Brembo calipers are directional, due to the use of differential piston sizes. The leading pistons are smaller in diameter in order to combat uneven wear of the brake pads. Upon close examination of the caliper, you will find a small arrow cast in place that denotes the direction of disc rotation. Additionally, when mounted on the vehicle, the bleed screw(s) must be at the top of the caliper.

ORIENTACION DE LA PINZA

Las pinzas Brembo son direccionales, vienen utilizadas en relación a la dimensión del pistón. Los pistones guía son de menor diámetro con el fin de reducir el desgaste desigual de las pastillas. Después de haber examinado el cierre de la pinza se encontrará una pequeña flecha que indica la dirección de rotación del disco. Un vez montadas en el vehículo, la cara de contacto será posizionada en la parte alta de la pinza.

FLOATING DISCS

Brembo two-piece disc assemblies utilize a floating disc. The mounting system of the disc is designed to allow a specific amount of float in both the radial and axial directions. Brembo has engineered special springs that are used on every other fastener in order to slightly preload the assembly.

This has been done to prevent excessive noise from the system during street use, while still maintaining the benefits of a floating disc. These springs can be seen when looking at the backside of the disc.

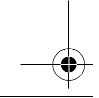
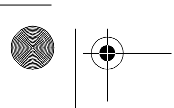
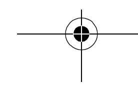
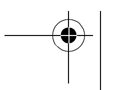
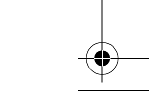
Those fasteners which do not have springs installed will not firmly clamp the bell and disc together, this is as it should be. The small screws on the backside of the disc are properly torqued during assembly and utilize thread lock compound to prevent loosening. They must not be tightened further.

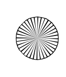
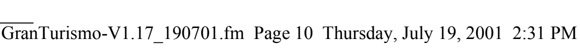
DISCO FLOTANTE

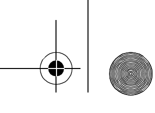
Para la unión del par de piezas del disco Brembo utiliza discos flotantes. El sistema de elevación del disco sigue especificaciones de flotación basadas en la dirección radial y axial. Brembo ha diseñado un sistema de muelles especiales que son utilizados en todos los cierres con la finalidad de cargar ligeramente la parte asamblada.

Esto evita el excesivo rumor que puede producir el sistema de frenado durante su utilización en carretera, mientras mantiene una estabilidad debido al disco flotante. Los muelles se encuentran posizionados en la parte posterior del disco.

Las fijaciones que no llevan muelles generalmente no fijan la campana con el disco. Los pequeños tornillos situados en la parte posterior del disco han sido fijados durante el montaje utilizando el relativo par de fuerzas de cierre, esto garantiza la duración del asemblaje.No es necesario apretarlos de nuevo.






BRAKE PADS

The brake pads that are provided with Brembo brake systems are high performance pads that offer a very broad temperature and performance range. The pads are effective at cold temperatures as well as the higher temperatures seen during performance driving. These pads are suited to high performance street driving. If interested in using alternate friction materials, please contact Brembo for recommendations. Please note that the brake pads supplied with the Gran Turismo kits do not have noise generators to alert when the pad needs to be replaced. Pads must be inspected periodically to ensure that disc damage does not result due to overly worn pads. Pads are considered fully worn when the friction material reaches 2mm in thickness.

DO NOT REMOVE DISC FROM BELL

Contact Brembo for instructions on the proper procedures for disc replacement.

DO NOT DISASSEMBLE CALIPERS

Do not attempt to loosen or tighten the bolt securing the caliper halves together.

DO NOT REMOVE CALIPER STUDS

Do not attempt to remove the caliper studs from the brackets.

PASTILLAS DEL FRENO

Las pastillas del sistema de frenado Brembo son de alta calidad y ofrecen un excepcional mantenimiento de la temperatura y rango. Las pastillas del freno se mantienen a bajas temperaturas aún cuando las temperaturas alcanzadas durante la circulación del vehículo son altas. Las pastillas satisfacen las màs altas prestaciones en carretera. Para la utilización de materiales de fricción alternativos, se aconseja contactar Brembo para eventuales recomendaciones. Es importante saber que las pastillas del freno del Gran Turismo Brembo no dan ninguna señal de alarma o ruido que indique la necesidad de sostitución. Se aconseja la revisión periodica del estado de las pastillas para evitar que un excesivo desgaste de las mismas provoque daños al disco del freno. Las pastillas se consideran completamente desgastadas cuando el espesor del material de fricción es inferior a 2mm.

NO DESMONTAR LA CAMPANA DEL DISCO

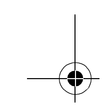
Contactar Brembo para efectuar los correctos procedimientos de sostitución del la campana interna del disco.

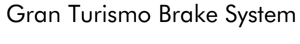
NO DESMONTAR LAS PINZAS

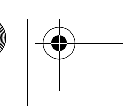
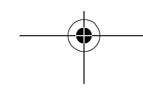
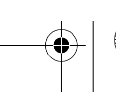
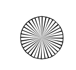
No apretar o aflojar la tuerca de seguridad que mantiene unidas las dos mitades de las pinzas.

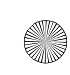
NO DESMONTAR LOS PERNOS DE LA PINZA

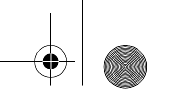
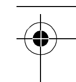
No desmontar los pernos de la pinza ni desalojarlos de la posición de montaje.







For any further information call:

En el caso que deseen informaciones más detalladas, pueden dirigirse a:

Brembo S.p.A.

Via Brembo, 25
24035 Curno (BG)
Italy
Phone ++39 035 605 111

Brembo North America

1585 Sunflower Avenue
Costa Mesa California
92626 - U.S.A.
Toll free: 1-800-325-3994

B.S.E. CO.LTD

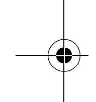
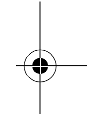
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Chome Ohta-Ku 145
Tokyo - Japan
0081 3 37269199

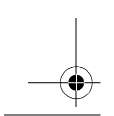
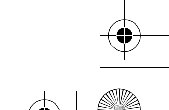
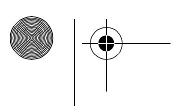
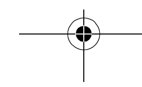
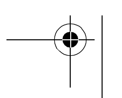
Or visit our web site:
www.brembo.com

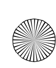
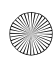
and particularly for the high performance section:
http://hp.brembo.com

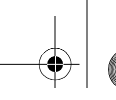
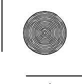
También es posible consultar el sito internet:
www.brembo.com

en particular para la sección high performance:
http://hp.brembo.com

GRAN TURISMO BRAKE SYSTEM COMPONENTS LIST

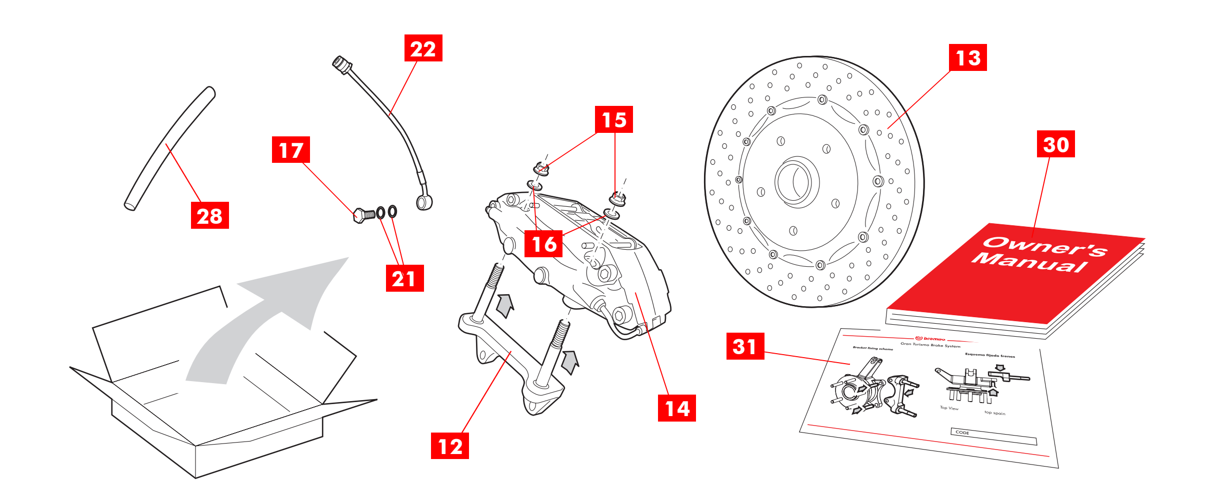
The following is a list of components which are included in each Gran Turismo System box, and includes all components for one corner of the vehicle.

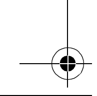
	Description	Qty
12	Caliper bracket (except for kits with lug mount calipers)	1
13	Disc	1
14	Caliper with brake pads installed	1
15 16	Nuts and washers	2+2
17	Inlet adapter fitting or banjo bolt	1
21	Copper sealing washers (1 with inlet adapter, 2 with banjo bolt)	1 or 2
22	Stainless steel braided brake line	1
28	Bleeder Hose	1
30	Owner's Manual	1
31	Bracket fixing scheme	1

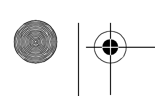
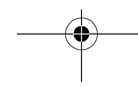
COMPONENTES DEL GRAN TURISMO BRAKE SYSTEM

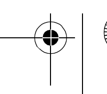
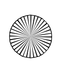
Lista de los componentes del kit del Gran Turismo Brake System "Disco compuesto", sólo de la parte relativa a un pneumático del vehículo.

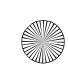
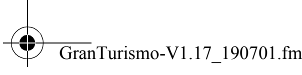
	Descripción	Cant.
12	Mordaza portapinzas (excepto en kits que lleven la pinza montada)	1
13	Disco	1
14	Pinza con pastillas montadas	1
15 16	Tuercas y arandelas (en bolsita de plástico)	2+2
17	Tornillo perforado y tubo de adaptación	1
21	Arandelas en cobre (1 con el adaptador, 2 con el tornillo perforado)	1 o 2
22	Tubo flexible.	1
28	Tubo de purga	1
30	Manual del usuario	1
31	Eschema de fijado pinza	1

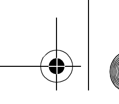
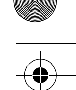




EQUIPMENT REQUIRED

The following tools and equipment are necessary for the installation of Gran Turismo Brake Systems:

 Wrenches

 Torque wrench

 Pliers

 Screwdriver

 Spacer

 Piston retractor

 Dial indicator with magnetic base

 Brake fluid collection tank

 Jack and jack stands

 Clean cloth

 Solvent for cleaning

 Brake fluid

 Vehicle service manual

HERRAMIENTAS NECESARIAS

Para montar y desmontar el Gran Turismo Brake System son necesarias las siguientes herramientas:

 Llaves fijas

 Llave dinamométrica

 Pinza

 Destornillador

 Separador

 Retractor

 Comparador de base magnética

 Recipiente para la recolección del líquido de frenos

 Dispositivo de levantamiento del vehículo o gato

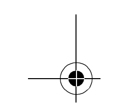
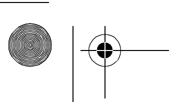
 Trapo limpio

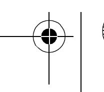
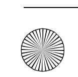
 Manual de instrucciones del vehículo

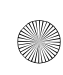
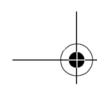
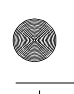
 Nafta para la limpieza

 Líquido de frenos



LIFTING AND SUPPORTING VEHICLE

- Slightly loosen wheel nuts or bolts before lifting the vehicle.
- Carefully lift the vehicle using the lift points indicated in the vehicle manufacturer's owners or service manual.
- Support the vehicle using jack stands, once again following the vehicle manufacturer's recommendations.
- Remove the wheel.

CAUTION

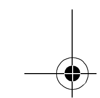
Do not rely on the jack to support the vehicle while performing the following operations. Failure to comply with the vehicle manufacturer's guidelines in lifting and supporting the vehicle can lead to injury, death, and/or property damage.

MANIPULACION Y ELEVACION DEL VEHICULO

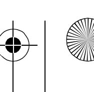
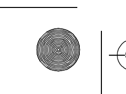
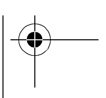
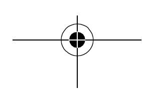
- Antes de elevar el vehículo hay que aflojar las tuercas de las ruedas.
- Levantar el vehículo cuidadosamente utilizando los puntos de elevación indicados por el fabricante en el libro de instrucciones del vehículo.
- Para sostener el vehículo se aconseja utilizar el gato siguiendo las indicaciones del constructor del vehículo.
- Extraer la rueda.

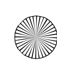
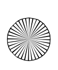
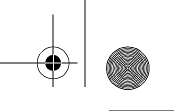
ATENCIÓN

Es aconsejable no confiarse cuando el vehículo esté levantado y se estén llevando a cabo las operaciones anteriomente señaladas. La falta de respeto de las normas escritas por el fabricante durante la elevación del vehículo puede causar graves daños a personas o cosas e incluso la muerte.








BYPASSING BRAKE PAD WEAR SENSOR

INDICATOR DE DESGASTE PASTILLAS

NOTE

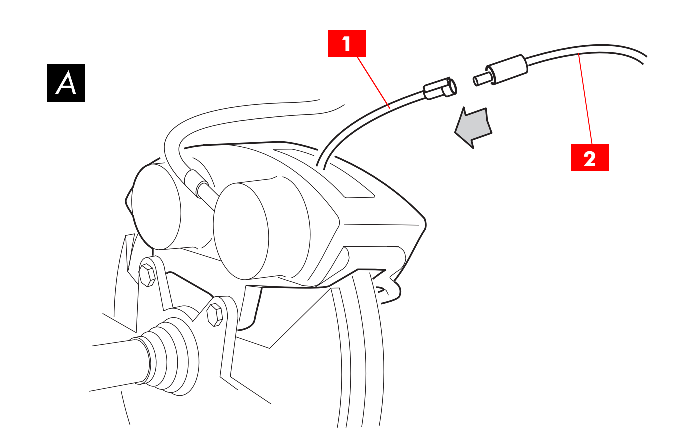
This procedure is only applicable to those vehicles equipped with an electronic pad wear indicator. If your vehicle is not so equipped, skip to ORIGINAL COMPONENT REMOVAL.

- **A** Disconnect the wear indicator cable **1** from the vehicle harness **2**.

NOTA

Este procedimiento es solo aplicable en los vehículos que estén equipados con un indicador electrónico del desgaste de las pastillas. Si su vehículo no está aquipado asi vaya al apartado RECAMBIO DE PIEZAS ORIGINALES.

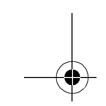
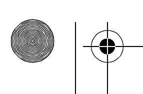
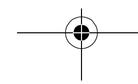
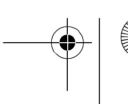
- **A** Desconectar el cable indicador del desgaste **1** del arnés del vehículo **2**.

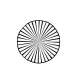
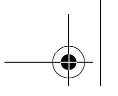
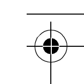


- Insert the key into the ignition and turn to the engine on position, without starting the engine.

- Introducir las llaves en el bloque de arranque y girar a la posición de encendido,sin hacer arrancar el motor.





- If the pad wear indicator lamp illuminates on the instrument cluster, perform the following steps; otherwise, turn the ignition key to the engine off position, and secure the vehicle harness 2 so that it is out of the way, and won't become stretched or entangled during suspension and steering movement. This is best accomplished using "zip" ties. Skip to ORIGINAL COMPONENT REMOVAL.

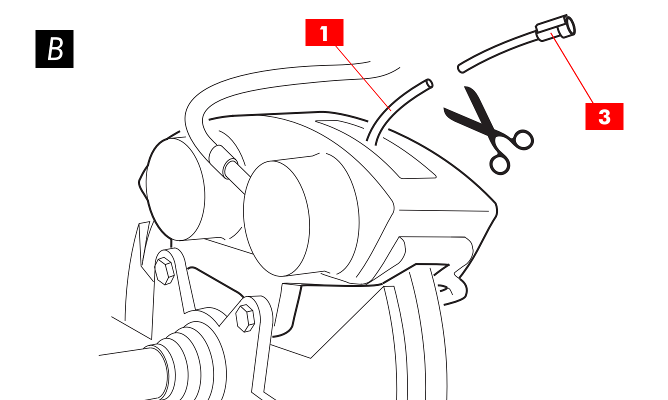
- Turn the ignition key to the engine off position.

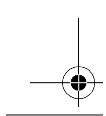
- B Cut the wear indicator cable 1 3 to 4 cm from the connector 3.

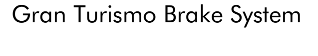
- Verificar el estado de la luz testigo de indicación de desgaste de las pastillas. Si la luz queda encendida hay que seguir el siguiente procedimiento; en caso contrario girar la llave de encendido a la posición de motor apagado y asegurarse que el arnés del vehículo 2 quede fuera de alcance, para que no quede atrapado o estirado cuando se mueve el volante. Es aconsejable utilizar lazos para fijarlo. Pasar al apartado de RECAMBIO PIEZAS ORIGINALES.

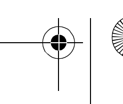
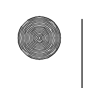
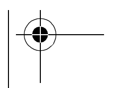
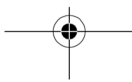
- Girar la llave de encendido en la direccion de arranque del motor.

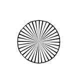
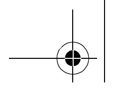
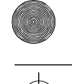
- B Cortar el cable del indicador de desgaste 1 a 3 o 4 cm de la clavija 3.







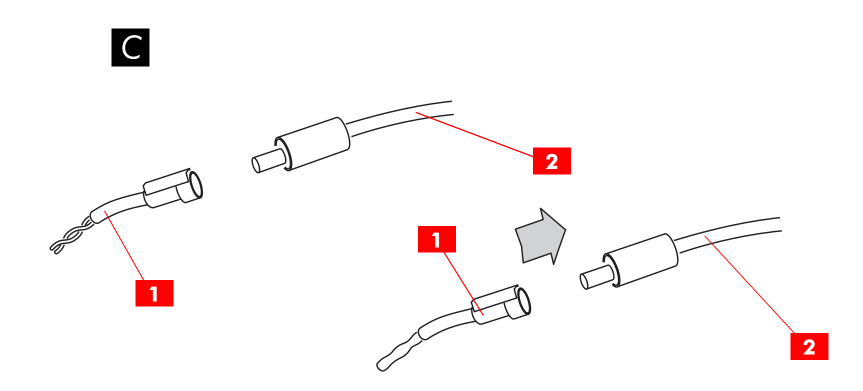




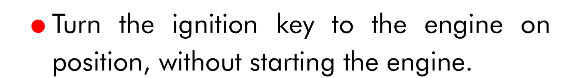
- C Connect the two ends of the cable 1 and insulate using electrical tape or heat-shrink tubing.

- C Reconnect the cable 1 to the vehicle harness 2.

- C Conectar los dos extremos de los hilos del cable 1 y aislar cuidadosamente.

- C Volver a conectar el cable 1 al terminal del vehículo 2.





- Turn the ignition key to the engine on position, without starting the engine.

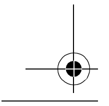
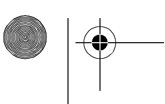
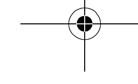
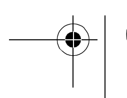
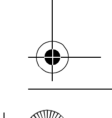
- Ensure that the pad wear indicator lamp on the instrument cluster remains off. If it still illuminates, re-check electrical connections from the previous steps.

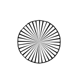
- Secure the harness 2 so that it is out of the way, and won't become stretched or entangled during suspension and steering movement. This is best accomplished using "zip" ties.

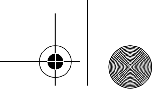
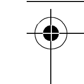
- Girar la llave del bloque de arranque a la posición de encendido
(sin hacer arrancar el motor).

- Verificar que la luz testigo de indicación de desgaste de las pastillas esté apagada.
Si la luz testigo queda encendida, hay que contactar el servicio de clientes de Brembo.

- Fijar en seguridad el cable 2 al vehículo con pequeñas abrazaderas, para evitar que salga de la sede, sea cortado o apretado durante las operaciones.





ORIGINAL COMPONENT REMOVAL

CAUTION

Use caution to ensure that brake fluid does not come in contact with any painted surfaces. If brake fluid should contact these surfaces, wash them immediately or damage could result.

- **D** If the vehicle's master cylinder is not equipped with an anti-drain back valve, the brake pedal can be slightly depressed to prevent excessive brake fluid leakage. This will move the master cylinder piston past the orifice which allows brake fluid to drain from the reservoir. To accomplish this, either obtain assitance from another person, or place a spacer **4** between the pedal and the seat to depress the pedal 1 ½ to 2 inches only. Do not depress the brake pedal further

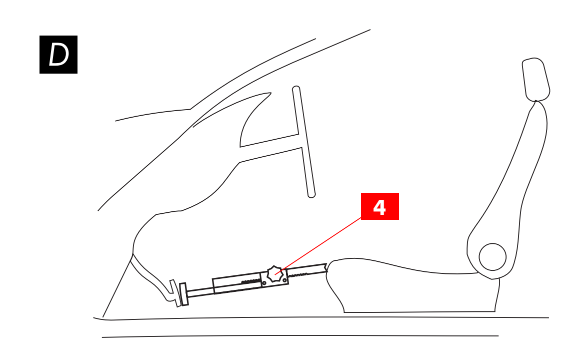
RECAMBIO DE LAS PIEZAS ORIGINALES

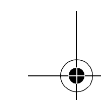
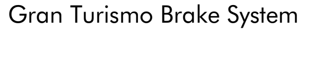
ATENCIÓN

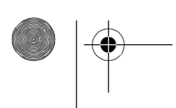
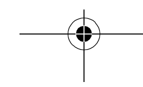
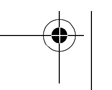
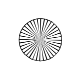
Prestar atención a que el líquido de los frenos no entre en contacto con las superficies pintadas. En caso contrario limpiar inmediatamente las superficies en contacto ya que sino pueden resultar dañadas.

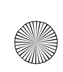
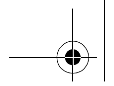
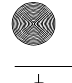
- **D** Si el cilindro guía del vehículo no viene equipado con una válvula de no retorno, el pedal del freno debe mantenerse ligeramente presionado para evitar una fuga del líquido de frenos. Esto moverá el pistón del cilindro maestro permitiendo al líquido de frenos pasar por el orificio de descarga del depósito. Para realizar esto se necesita la ayuda de otra persona o posizionar un separador **4** entre el asiento y el pedal del freno de forma que éste quede presionado de 1½ a 2 pulgadas. No presionar el pedal del freno más de lo recomendado.

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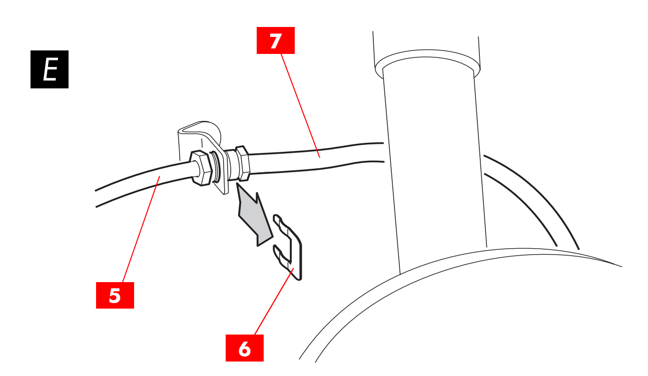




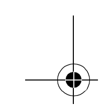
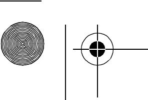
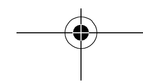
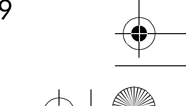
- E Loosen the brake line fitting at the chassis end 5. Use caution to prevent rounding the corners of the hard-line hex fittings. It is strongly recommended that a line-wrench be used when tightening or loosening these connections. Have a cloth and drain pan available to catch any brake fluid which leaks out.

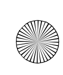
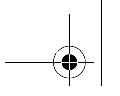
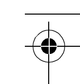
- E If present, remove all retaining clips 6 from the flexible brake line 7.

- E Desconectar el tubo flexible del freno al final del chasis 5. Prestar atención para evitar girar angulos no convenientes para el tubo. Se aconseja tener a mano un trapo o un paño para la recogida del líquido de frenos que pueda perderse.

- E Extraer el muelle de seguridad 6 fijado al inicio del tubo flexible 7.

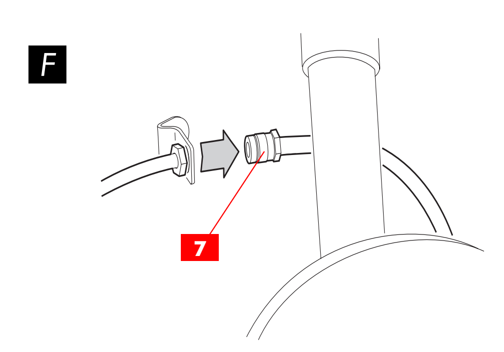


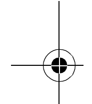





- F Remove the brake line 7 from the chassis bracket, and any other in-line connections that it may have. The line may remain connected to the brake caliper.

- F Desconectar el tubo del freno 7 del circuito del chasis, y todas las posibles conexiones que puedan exitir. El tubo debe quedar conectado a la pinza del freno.



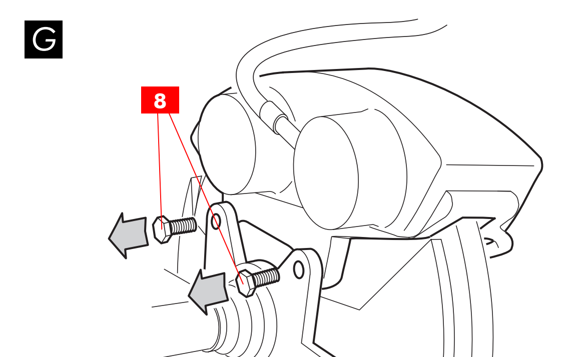


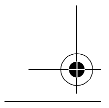
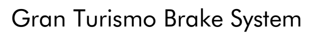
- F Use a plug to close the flexible brake line connected to the caliper 7 so that dirt is not inadvertently introduced.

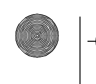
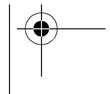
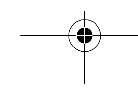
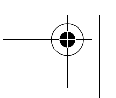
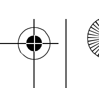
- G Remove the caliper mounting bolts 8 fastening the caliper to the knuckle.

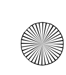
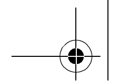
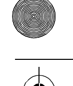
- F Cerrar el tubo flexible del freno que va a la pinza con un tapón 7 para evitar la posible entrada de polvo y suciedad.

- G Extraer los tornillos que sostienen la pinza 8 fijada al eje.



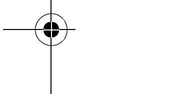
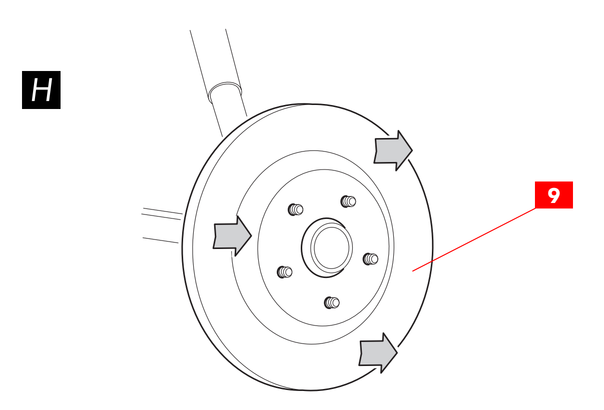






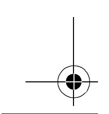




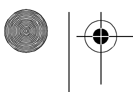
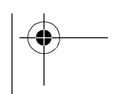
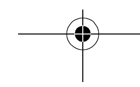
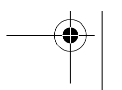
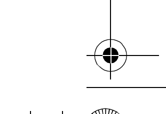


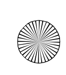
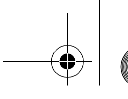
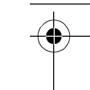
- Remove the caliper.
- **H** Locate and remove any screws or bolts holding the original brake disc to the hub. Remove the original disc **9** from the hub. If the disc is difficult to remove, there may be a threaded hole in the hub face of the brake disc to aid in its removal. In these cases, thread a bolt with the correct size and pitch into this hole until it pushes the disc off the hub face. In the absence of a hole of this type, or a suitable bolt, use a rubber mallet to tap the back side of the disc at several points around its circumference until it is freed from the hub face. The disc may then be removed.

- Extraer la pinza.
- **H** Extraer y destornillar todas las tuercas y tornilos que pertenecen al disco del freno. Extraer el disco original de la sede **9**. Si se presentan dificultades en la extracción del disco, puede haber un agujero de introducción que puede ayudar a la extracción. En este caso se puede introducir un tornillo de dimensión igual al agujero hasta que éste empuje la parte metálica del disco separándola de la sede. En el caso no exista el agujero ni sea posible utilizar el tornillo, usar una maza de goma y golpear en varios puntos hasta que el disco se separe de la sede y pueda ser extraido.

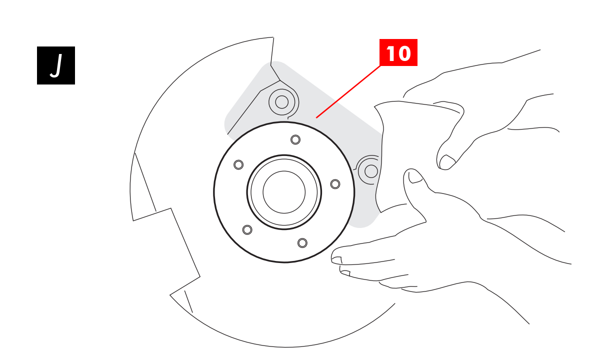


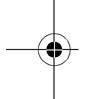






- J Clean spece the caliper mounting surfaces 10 using a cloth moistened with solvent to remove any contaminants. If corrosion is present on these surfaces, remove with an abrasive pad or wire brush.

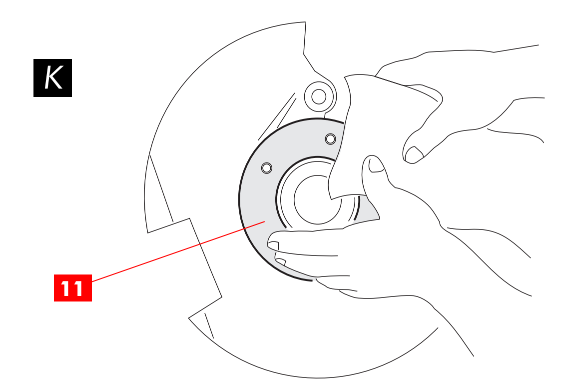
- J Limpiar las superficies de montaje de la pinza 10 utilizando un trapo mojado en solvente que limpie todo tipo de suciedad. Si hay corrosión en las superficies, limpiar con un papel de lija o cepillo metálico.

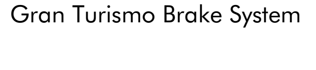


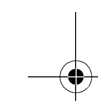
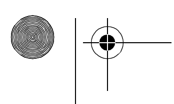
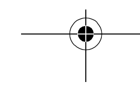
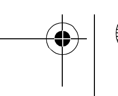
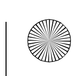


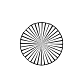
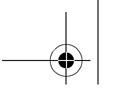
- K Clean the disc mounting area of the hub face 11 using a cloth moistened with solvent to remove any contaminants. If corrosion is present on these surfaces, remove with an abrasive pad or wire brush.

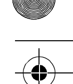
K Limpiar la sede de posición del disco 11 utilizando un trapo mojado en solvente que limpie todo tipo de suciedad. Si hay corrosión en las superficies, limpiar con un papel de lija o cepillo metálico.





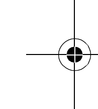
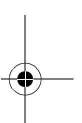



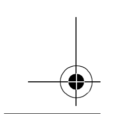
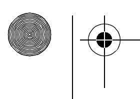
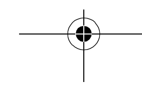
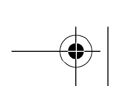
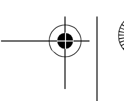


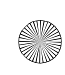
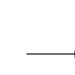
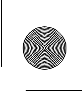


- In many cases, the original dust/splash shield will have to be removed in order to fit the larger *Gran Turismo* brake disc. Test fit the *Gran Turismo* brake disc. If the *Gran Turismo* disc cannot sit flat on the hub face and rotate freely with a minimum of 3 mm of clearance, the shield must be removed. Refer to the vehicle manufacturer's service manual for the removal procedure.

- En muchos casos, el escudo de polvo/mancha original debe ser extraido accediendo al disco de frenado del Gran Turismo. Probar el acceso al disco. Si el disco de frenado Gran Turismo no se apoya en la superficie de la sede y gira libremente con un mínimo de 3mm de juego, el escudo tiene que ser extraido. Consultar el manual del fabricante para el procedimiento de extracción.

GRAN TURISMO COMPONENT INSTALLATION

NOTE

Gran Turismo Brake Systems are supplied in two separate packages, which constitute left hand and right hand brake elements, and are labeled as such. Ensure that the correct component set is used on each side of the vehicle, and do not mix components from the two separate packages.

NOTE

Brembo recommends that the disc runout measurement be performed upon installation of the new disc. This is to ensure that the vehicle hub/upright/bearing is in perfect working order. If a vibration problem should be present, and this procedure has not followed due to lack of availability of the proper tools and equipment, take the vehicle to a facility capable of performing these measurements.

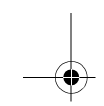
INSTALACION DE PIEZAS *GRAN TURISMO*

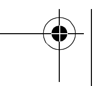
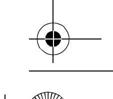
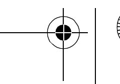
NOTA

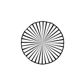
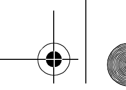
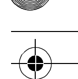
Gran Turismo Brake Systems están confecionados por separado y diferenciados en elementos del grupo frenos delantero izquierdo y elementos del grupo frenos delantero derecho. Esto asegura que sean utilizados correctamente los componentes relativos a cada lado del vehículo evitando mezclar los componentes.

NOTA

Brembo recomienda hacer las calibraciones necesarias antes de instalar el nuevo disco. Esto garantiza que la sede/vertical/cojinetes estén en perfecto estado. Si se presenta un problema de vibraciones y este procedimiento no puede ser efectuado debido a la falta de las herramientas y del equipo adecuado, es conveniente llevar el vehículo a un profesional capaz de llevar a cabo dichas medidas.

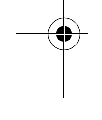


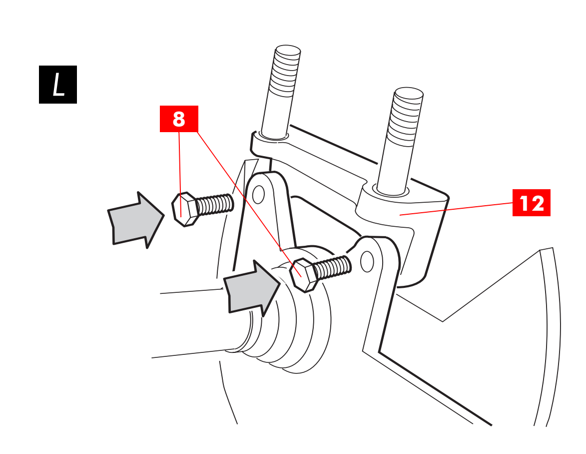




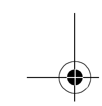




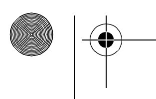
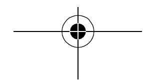
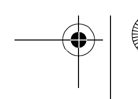
- L If your system uses lug mount calipers, skip to step O. Refer to the diagram 31 included with the system for proper bracket orientation. Install the bracket 12 on the knuckle using the bolts 8 that mounted the original caliper. If the original bolts are damaged in any way, purchase replacements from your vehicle manufacturer's parts department. In some cases, bolts are supplied with the *Gran Turismo* systems, and must be used for proper caliper bracket mounting. Ensure that the mounting surface of the bracket is in full contact with the mating surface on the knuckle. There must not be any interference between the bracket and the knuckle. Regardless of which bolts are used, torque to the vehicle manufacturer's specification for brake caliper mounting.

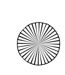
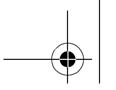
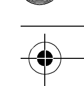
- L Si vuestro sistema utiliza montaje de pinzas tirado, saltar al paso O. Incluidos diagramas de referencia 31 con orientación del propio sistema de frenado. Instalar el freno 12 en el eje utilizando los tornillos 8 que fijaban la pinza original. Si los tornillos originales están dañados, habrá que sostituirlos con piezas nuevas que se pueden adquirir en la red de repuestos del fabricante del vehículo. En algunos casos, las tuercas son sustituidas con el Gran Turismo System, y puede ser utilizado para el montaje de las propias pinzas. Asegurarse que la superficie de contacto entre el freno y el eje sea total, no debe existir nada que interfiera en el contacto de las superficies. Observar el tipo de tuercas utilizadas y el par de fuerzas de cierre indicado por el fabricante para el montaje de la pinza del freno.





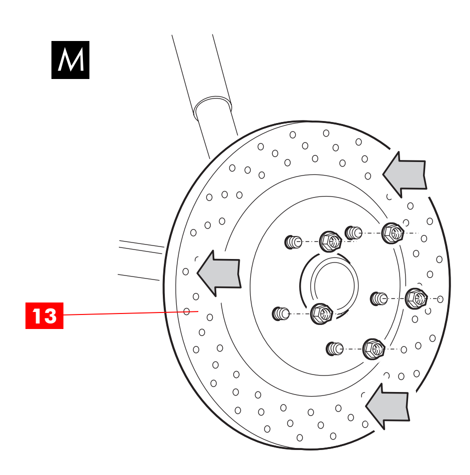


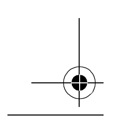
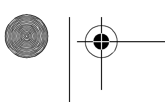
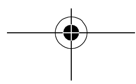
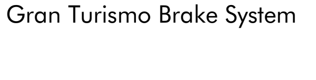
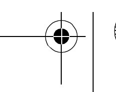
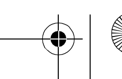





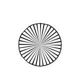
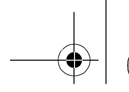




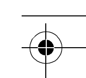
- M Place the disc 13 onto the hub. In most cases, if there were bolts or screws holding the original disc to the hub, these features have been duplicated in the Gran Turismo Brake Systems. If performing the following disc runout measurement, temporarily install all of the wheel nuts or bolts. Use several washers on each bolt or stud to prevent damage to the disc bell and to prevent the nuts or bolts from bottoming before securely clamping the disc to the hub. Torque to 14 Nm (10 ft•lbs).

- M Posicionar el disco en la sede 13. Generalmente vienen utilizados los tornillos y tuercas pertenecientes al disco original, estos componentes son duplicados en el sistema Gran Turismo Brake Systems. Si se efectúan las verificaciones necesarias, instalar temporalmente las tuercas y tornillos de la rueda. Limpiar minuciosamente cada tornillo o perno para evitar posible daños a la campana del disco y que queden tuercas o tornillos atrapados entre la superficie del disco y la sede. Par de cierre 14 Nm (10 ft•lbs).



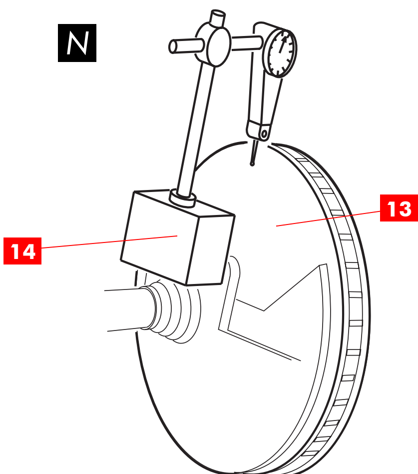
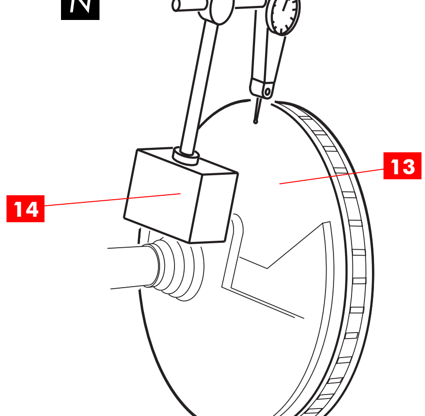











- N Place the magnetic base for the dial indicator 14 solidly on the vehicle ensuring that it will not move during the measurement taking procedure. Place the dial indicator needle on the inboard braking surface of the disc 13 approximately 3-5mm from the outer edge of the disc. Ensure that the needle will not contact a hole or slot in the disc when rotated.

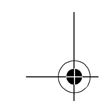
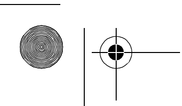
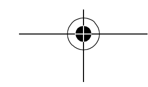
- Turn the disc through a full revolution. The total oscillation of the indicator should not exceed 0.07mm (0.003 inch).

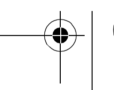
- If the disc runout exceeds this value, it may be possible to reduce it by indexing the disc on the hub face. However, if your vehicle utilizes bolts or screws to secure the disc to the hub, this will not be possible. In those cases where indexing is possible, repeat the above measurement for each index increment.

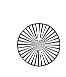
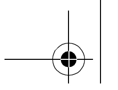
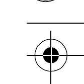
- N Colocar un comparador de base magnética 14 en la superficie de apoyo de la pinza asegurandose que ésta no se moverá durante el procedimiento de toma de medidas. Apoyar la punta del comparador sobre la cara interna del disco 13 a unos 3-5 mm del diámetro exterior. Asegurarse que la aguja no entre en contacto con agujeros o ranuras del disco cuando éste gire.

- Las oscilaciones totales en el indicador no tienen que exceder de 0.07mm (0.003 pulgadas.)

- Si los valores de giro del disco son superiores a los anteriores, es posible reducirlos por regulación del disco en la sede de éste. Siempre que el vehículo utilice tornillos o pernos para asegurar el disco a la sede, esto no será posible. Solo en los casos en los que se pueda regular el disco habrá que realizar las medidas necesarias para cada incremento de la regulación.



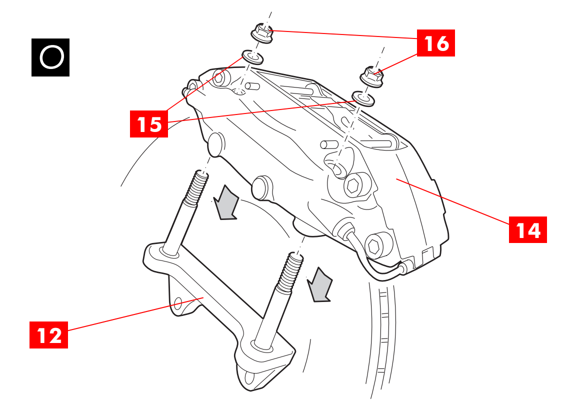




- If the runout still exceeds the above value, the vehicle hub/upright/bearing is most likely out of specification. Consult the vehicle manufacturer's service manual for the steps needed to correct this condition.

- O Slide the new caliper **14** over the disc and the studs on the bracket **12**. Install one washer **15** and one nut **16** onto each stud. These nuts are self-locking and have an oval crossection, they do not require thread lock compound. Torque each nut to 115 Nm (80 ft•lbs). If your system uses lug mount calipers, secure them to the knuckle using the bolts that mounted the original caliper. If the original bolts are damaged in any way, purchase replacements from your vehicle manufacturer's parts department. Torque to the vehicle manufacturer's specification for brake caliper mounting.

- Si los valores anteriormente enumerados siguen excediendo los valores recomendados la sede/vertical/cojinetes del vehículo son fuera de las expecificaciones. Consultar el manual del fabricante y los pasos necesarios para llevar a cabo la corrección.

- O Montar la mordaza **14** sobre el disco y los pernos en el freno **12**. Colocar una arandela **15** y una tuerca **16** sobre cada perno. Las tuercas son autobloqueantes y tienen un sección cruzada ovalada. El par de fuerzas de cierre para cada tuerca es 115 Nm (80 ft•lbs). Si su sistema lleva pinzas montadas, asegurese que el eje use tornillos utilizados en la pinza original.Si los tornillos originales estuvieran dañados, se sustituirán con piezas nuevas que se puedan adquirir en la red de repuestos del fabricante del vehículo. El par de cierre de la pinza del freno viene indicada en las especificaciones del fabricante.

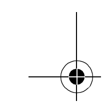
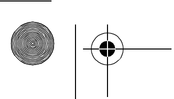
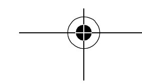


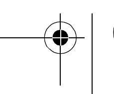
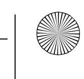
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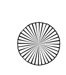
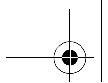
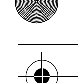
Do not apply sealant or thread lock to any brake line connections.

NOTA

No aplicar masillas impermeables o bloqueos fileteados a los bulones orientables.

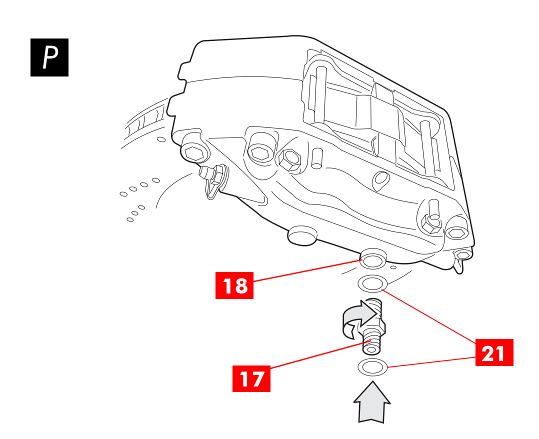




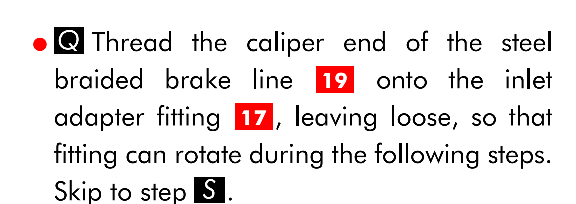



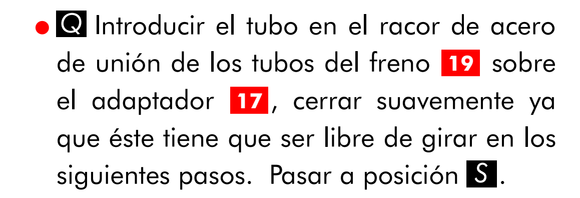
- Remove the threaded plastic plug from the fluid inlet on the side of the caliper.
- P For systems supplied with an inlet adapter fitting 17, insert the short end of this fitting through the supplied copper sealing washer 21, and thread into the fluid inlet on the caliper 18. Torque fitting to 20 Nm (15 ft•lbs).

- Extraer el tapón de plástico utilizado para evitar la pérdida de líquido de frenos.
- P Para sistemas con un adaptador añadido 17, inserir un anillo de cobre suplemetario de sigilo 21 y atornillar al interno del tubo de la pinza 18. Par de cierre 20 Nm (15 ft•lbs).

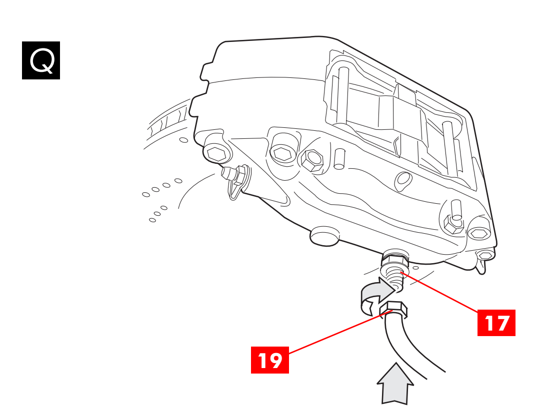


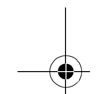
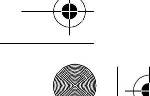
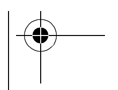
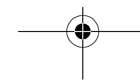
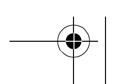
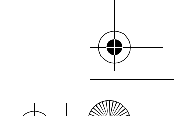


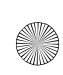
- Q Thread the caliper end of the steel braided brake line 19 onto the inlet adapter fitting 17, leaving loose, so that fitting can rotate during the following steps. Skip to step S.

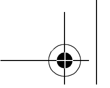
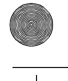


- Q Introducir el tubo en el racor de acero de unión de los tubos del freno 19 sobre el adaptador 17, cerrar suavemente ya que éste tiene que ser libre de girar en los siguientes pasos. Pasar a posición S.



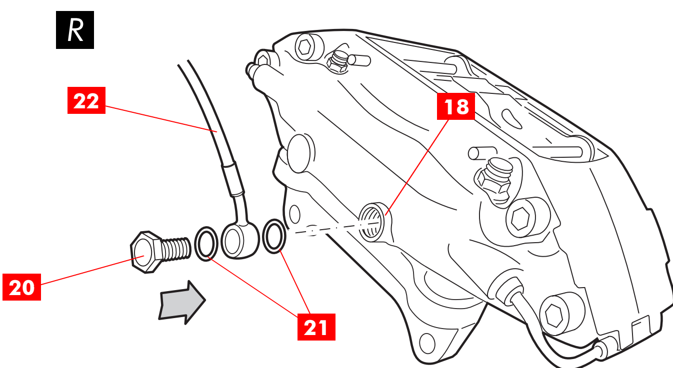




- R For systems supplied with a banjo bolt fitting, insert the banjo bolt 20 through a copper sealing washer 21, the banjo fitting 22, and the second copper sealing washer 21. Thread the bolt into the fluid inlet of the caliper 18, leaving loose, so that the fitting can rotate during the following steps.

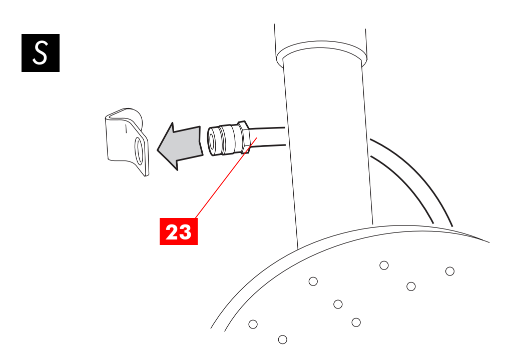
- R Para sistemas suplemetarios con tornillo perforado, hay que introducir el mismo 20 en la arandela de cobre que sirve para sigilar 21, el adaptador perforado 22, y una segunda arandela de cobre de sigilo 21. Introducir un tornillo 18 en el foro de salida del fluido. Cerrar suavemente ya que éste tiene que ser libre de girar en los siguientes pasos.

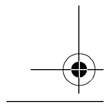
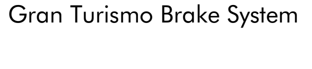


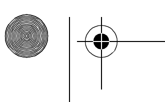
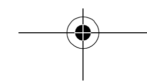
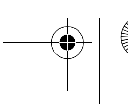


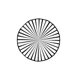
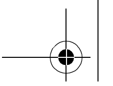
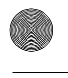
- S Connect the brake line to any in-line connections that it may have. Insert the brake line end-fitting 23 into the frame bracket, ensuring that the line does not become twisted.

- S Conectar el tubo e introducir el muelle de seguridad 23 fijado en la entrada del tubo flexible asegurandose que la linea del tubo no sea duplicada.



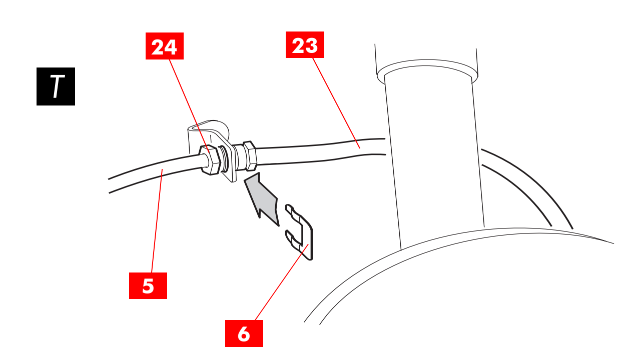



- T Reconnect the brake line 23 to the chassis hard-line 5. Install any brake line retaining clips 6. Tighten the fittings 24 to the vehicle manufacturer's specification.

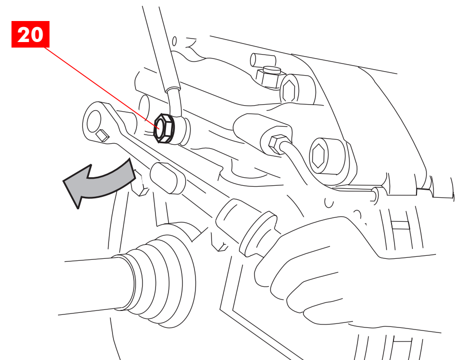
- T Conectar el tubo flexible 23 de la pinza del racor de envío 5 de aceite a la instalación. Inastalar el tubo de freno 6. Unir los conductos 24 según especificaciones del fabricante.

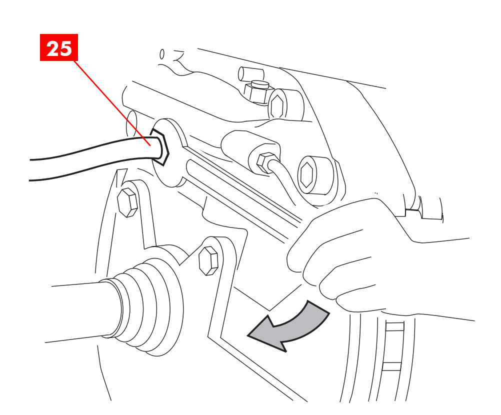


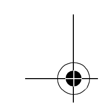
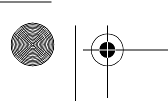
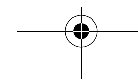
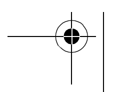
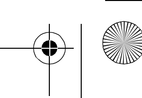
- T Tighten caliper end of the brake line 25, or the banjo bolt 20, depending on which your system is equipped with, to a torque of 20 Nm (15 ft•lbs), ensuring that the line does not become twisted.

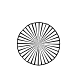
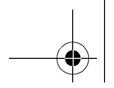
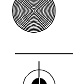
- T Apretar el tornillo perforado 20, con un par de 20Nm (15 ft•lb) utilizando el circuito de frenado 25, asegurandose que la linea del tubo no sea duplicada.







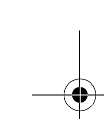




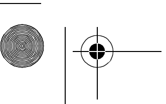
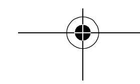
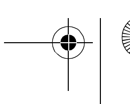
- Temporarily install the wheel and move the steering through its full range of motion; and inspect the brake line installation to ensure that it does not kink, stretch, or unnecessarily come in contact with suspension or chassis components. The brake line may be "indexed" in order to achieve the best fitment under all conditions

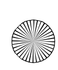
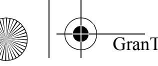
- Repeat these operations for the other side of the vehicle.

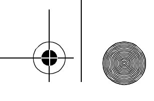
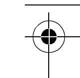
- Durante la instalación de la rueda mover contemporaneamente el volante y inspeccionar el tubo de instalación del freno asegurándose que éste no toque, rodee o apriete componentes de la suspensión o del chasis del vehículo. El conducto frenos puede estar corregido de forma que alcance el mejor llenado en cualquier condición.

- Repertir las mismas operaciones para la otra parte del vehículo.



BRAKE BLEEDING PROCEDURE

CAUTION

Air trapped in the brake circuit severely hampers its function. The bleeding procedure must be carefully performed.

CAUTION

Use caution to ensure that brake fluid does not come in contact with any painted surfaces. If brake fluid should contact these surfaces, wash them immediately, or damage could result.

CAUTION

Use brake fluid type specified by vehicle manufacturer to avoid possible fluid incompatibilities. Only use new fluid directly out of the bottle.

NOTE

There are several acceptable methods of brake bleeding. Detailed below is merely one option.

NOTE

There are either 1 or 2 bleed screws on each caliper. The bleeding procedure must be performed on all bleed screws that are in the system.

PROCEDIMIENTO DE EXPURGO

ATENCIÓN

El aire atrapado en el circuito de frenado impide el correcto funcionamiento del mismo. Se recomienda efectuar correctamente las operaciones de expurgo y restablecimiento de aceite.

ATENCIÓN

Asegurarse que el líquido de frenos no entre en contacto con superficies pintadas. Si esto sucediese hay que limpiar inmediatamente las superficies ya que pueden resultar dañadas.

ATENCIÓN

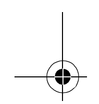
Utilizar líquido de frenos recomendado por el fabricante ya que otros líquidos pueden crear incompatibilidades. Utilizar líquido de frenos nuevo y que sea compatible.

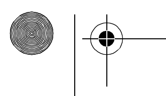
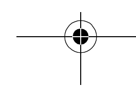
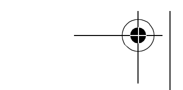
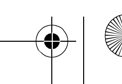
NOTA

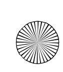
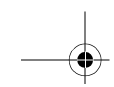
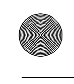
Los métodos de expurgo deben ser realizados con cuidado. Un ejemplo viene detallado a continuación.

NOTA

En cada pinza existen 1 ó 2 agujeros para expurgar. La procedura de expurgo debe realizarse en todos los agujeros presentes en el sistema.



NOTE

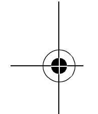
During the bleeding procedure, ensure that the brake fluid reservoir on the master cylinder does not fall below the minimum level marked on the reservoir.

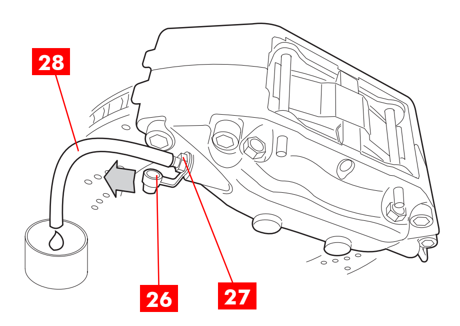
- U Remove the protective cap 26 from the inboard bleed screw 27.
- U Slide the supplied bleeder hose 28 over the bleed screw 27.
- U Place the free end of the hose 28 into a collection tank to catch the expelled fluid.

NOTA

Durante el expurgo asegurarse que el nivel del líquido de frenos existente en el depósito no se encuentre por debajo del nivel mínimo admitido. De ser necesario rellenar con el líquido apropiado.

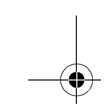
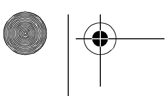
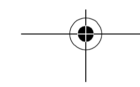
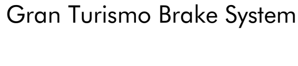
- U Extraer el tapón protector 26 en la válvula de expurgo interior 27.
- U Introducir el tubo transparente 28 en la válvula de expurgo 27.
- U Acomodar un recipiente en el extremo del tubo trasparente 28 para recoger el líquido que sale.

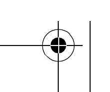
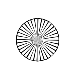


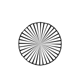
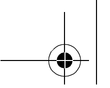
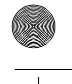


- Repeatedly press the brake pedal.

- Accionar repetidamente el pedal del freno en el vehículo.

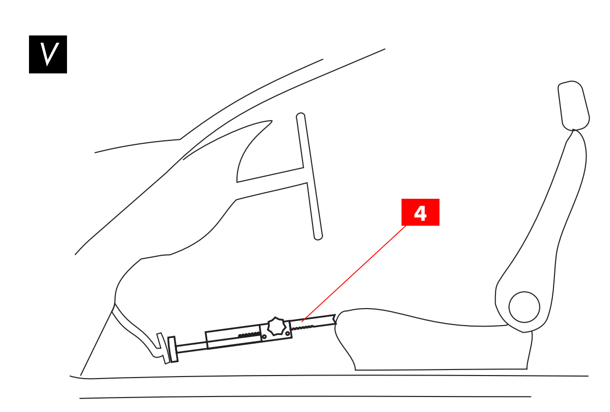





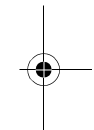
- V Keep the brake pedal pressed either by obtaining the assistance of another person, or by placing a spacer 4 between the brake pedal and the seat.

- V Mantener el pedal del freno presionado utilizando el separador 4 dentro de la cabina, entre el asiento y el pedal del freno, o sirviéndose de la ayuda de otra persona.

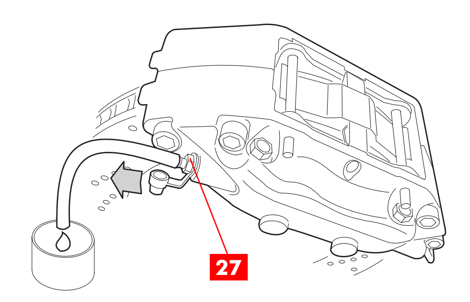


- W Loosen the bleed screw 27 ½ to ¾ of a turn, allowing fluid and air to escape.

- W Aflojar la válvula de espurgo del tubo 27 de ½ a ¾ de giro, permitiendo al líquido y al aire de salir.

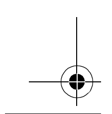
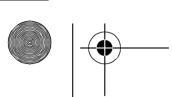
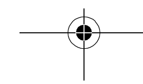
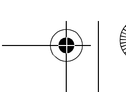
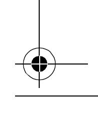


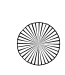
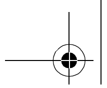
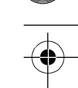
.

- W While the pedal is still depressed, tighten the bleed screw 27 so that it is seated, but do not overtighten.

- W Mientras se quita la presión del pedal, cerrar la válvula de expurgo 27 hacerlo lentamente de manera que no se pase de rosca.

- Allow the brake pedal to return to the relaxed position, wait several seconds, and repeat the preceding operations until clean fluid, free of air bubbles emerges.
- Repeat these operations for the outboard bleed screw.
- Repeat entire procedure for opposite side of vehicle.

NOTE

Despite the proper execution of the bleeding procedure, there may be small air bubbles trapped in the small gap between the pistons and the piston bores in the caliper. The following steps describe the best method of ensuring that this air is removed. If a piston retractor such as that used in the following steps is unavailable, it is possible to use a pair of pliers with protected jaws to perform the same function. Use caution to ensure that no damage is caused to the caliper or pads if performing the procedure in this manner.

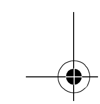
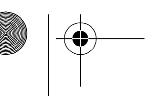
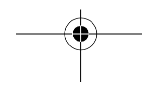
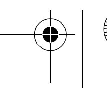
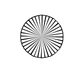
- X Remove the protective cap **26** from the inboard bleed screw **27**.
- X Slide the supplied bleeder hose **28** over the bleed screw **27**.

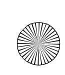
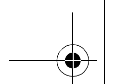
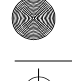
- Extraer el separador del pedal, esperar algunos segundos, luego repetir las operaciones en la misma válvula de expurgo hasta que salga fluido sin burbujas de aire.
- Repetir el procedimiento de expurgo también para la válvula exterior.
- Repetir el procedimiento de expurgo también para la otra parte del vehículo.

NOTA

La no correcta ejecución del procedimiento de expugo puede generar la aparición de burbujas entre los pistones y los pistones de la pinza freno. A continuación se describe el mejor método para desalojar el aire aprisionado. Si el pistón retractor no está en condiciones de efectuar dicha operación, se pueden utilizar un par de pinzas con los extremos protegidos para realizar la misma operación. Es necesario prestar atención para que las pinzas del freno y las pastillas no sean dañadas.

- X Extraer el tapón protector **26** en la válvula de expurgo interior **27**.
- X *Introducir el tubo transparente* **28** en la válvula de expurgo **27**.

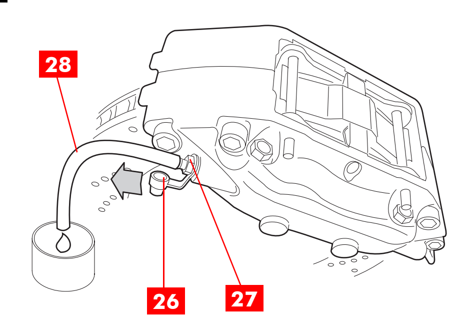






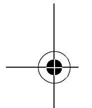





- X Place the free end of the hose 28 into a collection tank to catch the expelled fluid.

- X Posicionar un recipiente en el extremo del tubo transparente 28 para recoger el líquido que sale.


X





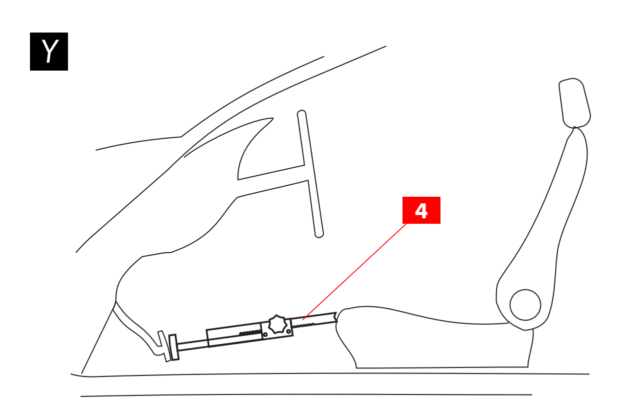
- Press the brake pedal several times to ensure the brake pads are in full contact with the disc.

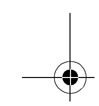
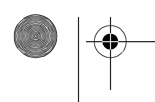
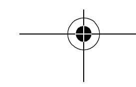
- Presionar el pedal del freno varias veces para asergurarse que las pastillas del freno entren en contacto con el disco.

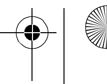
- Y Keep the brake pedal pressed either by obtaining the assistance of another person, or by placing a spacer 4 between the brake pedal and the seat.

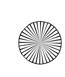
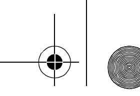
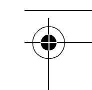
- Y Mantener presionado el pedal del freno utilizando un distanciador entre el asiento y el pedal 4 o con la ayuda de otra persona.

Y



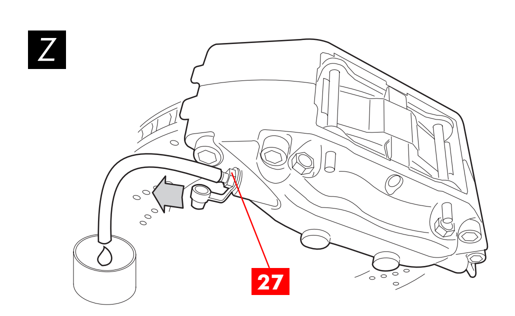






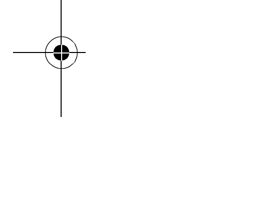
- Z Loosen the inboard bleed screw 27 ½ to ¾ of a turn.

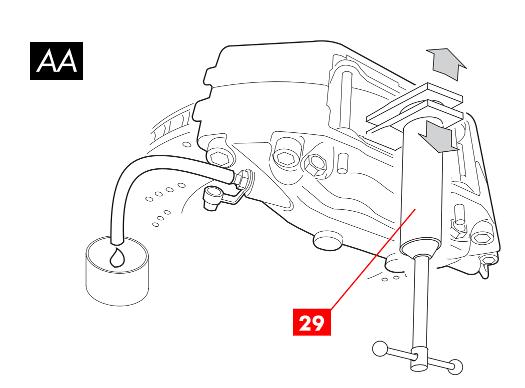
- Z Aflojar con un llave fija la válvula de expurgo 27 de ½ a ¾ de giro.



- AA Use the retractor 29 to push the pistons back into the calliper. This will force fluid and any air which was trapped out through the open bleed screw.

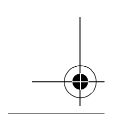
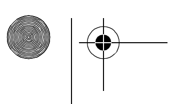
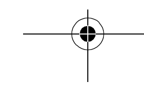
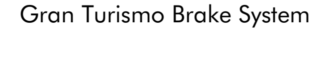
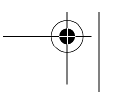
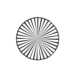
- AA Utilizar el retractor 29 para empujar los pistones en la pinza del freno. Esto ayudará a la extración del líqudo y del aire atrapado en el circuito.

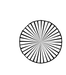
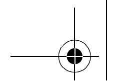
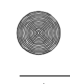




- Press the brake pedal to its final travel and hold.
- Tighten bleed screw.
- Allow the brake pedal to return to the relaxed position. Repeatedly press the brake pedal until it becomes firm.

- Pisar el pedal del freno hasta el fondo y mantener.
- Apretar la válvula de expurgo.
- Soltar el pedal del freno hasta que éste retorne a la posición de relax. Repertir esta operación hasta que quede estable.

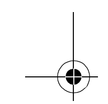
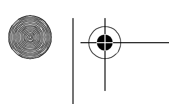
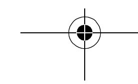
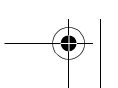
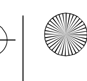




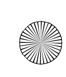


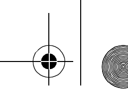
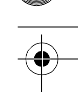
- Repeat process once, beginning from step **U**.
- If so equipped, repeat these operations for the outboard bleed screw.
- Repeat entire procedure for opposite side of vehicle.
- Torque all bleed screws to 14 Nm (10 ft•lbs).
- Inspect for any fluid leaks while system is under pressure.
- Check the fluid level in the brake fluid reservoir. Fill to the maximum level indicated on the reservoir.
- Reinstall the wheels and torque the wheel nuts to the vehicle manufacturer's specification.
- Carefully lower the vehicle in compliance with safety standards.

- Repetir el procedimiento empezando cada vez desde el paso **U**.
- Si está equipado repetir estas operaciones para la válvula de expurgo.
- Repetir todo el procedimiento para la otra parte del vehículo.
- Par de fuerzas de cierre del tornillo de la válvula 14Nm (10 ft•lbs).
- Controlar posibles fugas de líquido de frenos cuando el circuito está en presión.
- Controlar el nivel de líquido de frenos en el depósito. Llenar hasta el nivel máximo indicado en el depósito.
- Reinstalar la rueda y fijarla con los tornillos y tuercas siguiendo las especificaciones del fabricante.
- Poner en marcha el vehículo siguiendo las disposiciones para la seguridad en carretera.





BEDDING NEW PADS AND DISCS

CAUTION

Proceed with caution. Do not use brake system heavily until the following procedure has been completed.

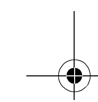
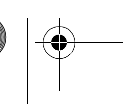
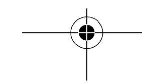
- While vehicle is stationary, pump brakes to ensure a firm pedal.
- Drive vehicle cautiously to test fit and function.
- Brakes should be smooth, with no vibrations, judder, etc.
- Drive the vehicle to a remote area and perform at least 30 brake applications of 3 second duration. Use light/medium deceleration with varying starting speeds. Leave at least ½ mile between each brake application.
- The purpose of this procedure is to gradually increase the temperature in the components without thermal shock, and to mate the brake pad and disc friction surfaces.
- After the repeated stops, drive the vehicle for several miles with little or no braking in order to adequately cool the components.
- The system is now ready for normal use.

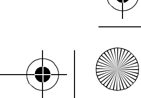
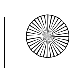
PRUEDA DE PASTILLAS Y DISCOS NUEVOS

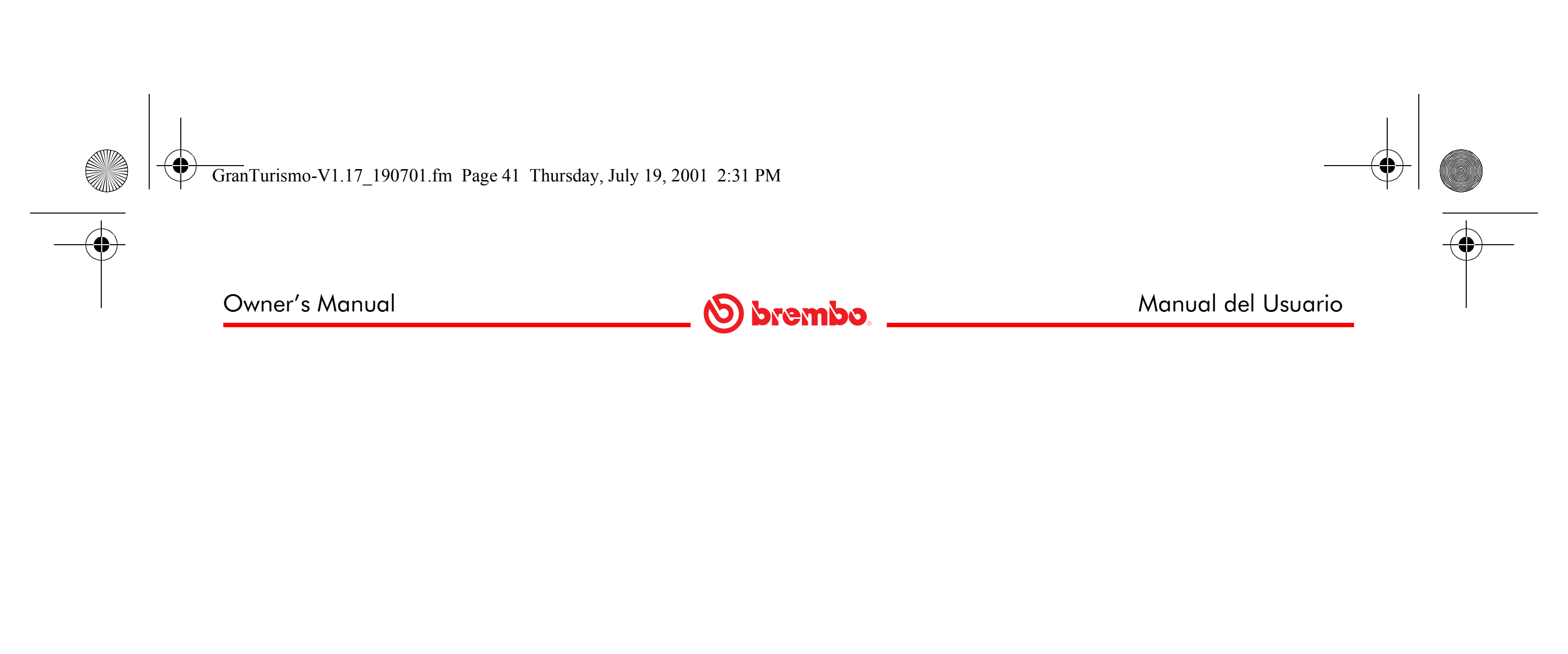
ATENCIÓN

Proceder con precaución. No utilizar el sistema de frenos hasta que la ejecución del procedimiento de sustitución no ha sido terminado.

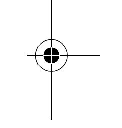
- Cuando el vehículo se encuentre estacionado, bombear los frenos para probar la firmeza del pedal.
- Conduzca con cuidado mientras pruebe su funcionamiento.
- La frenada debe ser fluida y homogénea, sin vibraciones, deslizamientos etc...
- Conducir el vehículo en un area aislada y efectuar 30 frenadas de 3 s. de duración. Utilice una deceleración baja/media variando la velocidad inicial. Percorra, aproximadamente, 1/2 milla entre frenada y frenada.
- El objetivo de este procedimiento de prueba es el de aumentar la temperatura de los componentes sin crear un shock térmico y hacer coincidir las superficies de contacto de las pastillas con el disco.
- Después de repetidas frenadas , conducir el vehículo durante algunas millas fenando poco o nada, esto sirve para enfriar los componentes del circuito de frenado.
- Ahora el circuito está preparado para ser utilizado normalmente.

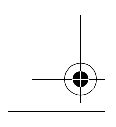




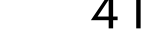



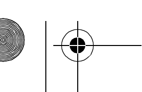


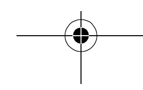


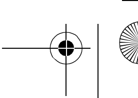


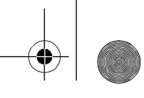
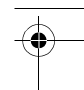


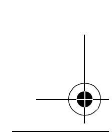


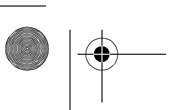
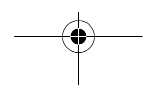
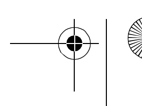


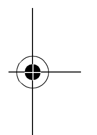


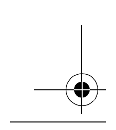


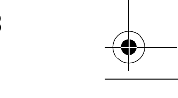



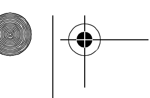


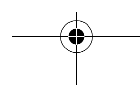




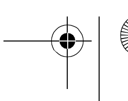













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